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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/733,012

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Christopher L. Coleman

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EXAMINER

CURS, NATHAN M

ART UNIT

PAPER NUMBER

2613

DATE MAILED: 09/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/733,012	COLEMAN, CHRISTOPHER L.	
	Examiner	Art Unit	
	Nathan Curs	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 December 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/03</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claim 18 is objected to because of the following informalities: it is a method claim depending from claim 11 (an apparatus claim). The claim as been examined assuming this is a typo and that claim 18 was intended to depend from claim 13. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 2, 6, 7, 12-14 and 16-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Green et al. ("Green") (US Patent Application Publication No. 2002/0141011).

Regarding claim 1, Green discloses a free-space parallel optical interconnect, comprising: a first module, comprising: a first die comprising an array of light sources, each light source emitting light (fig. 2, element 47 and paragraphs 0025-0029); and a first common lens for directing the light from each light source to a second module (fig. 2, element 49); the second module (fig. 4 and paragraph 0037).

Regarding claim 2, Green discloses the interconnect of claim 1, wherein the array of light sources is selected from the group consisting of an array of vertical cavity surface-emitting lasers (VCSELs), an array of edge-emitting lasers, and an array of light emitting diodes (LEDs) (paragraph 0025).

Regarding claim 6, Green discloses the interconnect of claim 1, wherein the first module further comprises: a second die comprising an array of detectors; and a second common lens for directing light from the second module to the detectors (fig. 2, elements 55 and 53 and paragraphs 0030-0032).

Regarding claim 7, Green discloses the interconnect of claim 1, wherein the second module comprises: a second die comprising an array of detectors and a second common lens for directing the light from each light source to a corresponding detector (fig. 4, element 91 and paragraphs 0037 and 0043).

Regarding claim 12, Green discloses the interconnect of claim 7, wherein the second module further comprises: a third die comprising another array of light sources, each light source emitting light and a third common lens for directing the light from the second module to the first module (fig. 4, elements 89 and 101 and paragraph 0037).

Regarding claim 13, Green discloses a method for transmitting data in parallel, comprising: emitting light from each light source in an array of light sources in a first module, wherein the light from each light source carries data and directing the light from each light source with a first common lens to a second module (fig. 2 and paragraphs 0025-0029).

Regarding claim 14, Green discloses the method of claim 13, further comprising: directing light from the second module with a second common lens to detectors in the first module (fig. 4 and paragraph 0037 and 0043).

Regarding claim 16, Green discloses the method of claim 13, further comprising: directing the light from each light source with a second common lens to a corresponding detector in an array of detectors in the second module (fig. 4 and paragraph 0043).

Regarding claim 17, Green discloses the method of claim 13, further comprising: emitting light from each light source in a second array of light sources in the second module and

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directing the light from the second module with a second common lens to the first module (fig. 4 and paragraph 0037).

Regarding claim 18, Green discloses the method of claim 13, further comprising:
emitting light from each light source in a second array of light sources in the second module and directing the light from the second module with the first common lens to the first module (fig. 4 and paragraph 0037 and 0043).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 3, 4, 9, 10 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Green (US Patent Application Publication No. 2002/0141011) in view of Kube et al. ("Kube") (US Patent Application Publication No. 2004/0033078).

Regarding claims 3 and 9, Green discloses the interconnect of claims 1 and 7, but does not disclose that the light sources and detectors are spaced apart by 50 microns. Kube discloses a free-space array based optical transceiver where the spacing of transmitters and receivers in arrays is within tens of microns (paragraphs 0042 and 0043). It would have been obvious to one of ordinary skill in the art at the time of the invention to space the transmitters and receivers in the arrays of Green within tens of microns, in order to reduce the size of the optical components and allow a larger number of components in the same array space, as suggested by Kube.

Regarding claim 4, Green discloses the interconnect of claim 1, but does not disclose that the first die further comprises an array of detectors and the first common lens further directs light from the second module to the detectors. Kube discloses a free-space array based optical transceiver where the transmitter elements and receiver elements are together on the same plate (paragraphs 0038-0040). It would have been obvious to one of ordinary skill in the art at the time of the invention to form the array of detectors on the same first die as the transmitters and to share a lens in Green, in order to reduce the space needed for the optical components, as suggested by Kube (paragraph 0042).

Regarding claim 10, Green discloses the interconnect of claim 7, but does not disclose that the second die further comprises a second array of light sources, each light source emitting light and the second common lens further directs the light from the second module to the first module. Kube discloses a free-space array based optical transceiver where the transmitter elements and receiver elements are together on the same plate (paragraphs 0038-0040). It would have been obvious to one of ordinary skill in the art at the time of the invention to form the array of detectors on the same second die as the transmitters and to share a lens in Green, in order to reduce the space needed for the optical components, as suggested by Kube (paragraph 0042).

Regarding claim 15, Green discloses the method of claim 13, but does not disclose directing light from the second module with the first common lens to detectors in the first module. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to form the array of detectors on the same die as the transmitters and to share a lens in Green, as described above for claim 4.

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6. Claims 5 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Green (US Patent Application Publication No. 2002/0141011) in view of Presley et al. ("Presley") (US Patent No. 5422437).

Regarding claim 5, Green discloses the interconnect of claim 1, wherein the first module further comprises: a second die comprising an array of detectors (fig. 2), but does not disclose that the first common lens further directs light from the second module to the detectors. Presley discloses a free-space array based optical transceiver where the transmitter array and receiver array share the same lens (fig. 4 and col. 4, line 23 to col. 5, line 13). It would have been obvious to one of ordinary skill in the art at the time of the invention for the transmitter and receivers arrays of Green to share a lens, based on the teaching of Presley, to provide the benefit of using one components for multiple functions.

Regarding claim 11, Green discloses the interconnect of claim 7, wherein the second module further comprises: a third die comprising another array of light sources, each light source emitting light (fig. 4), but does not disclose that the second common lens further directs the light from the second module to the first module. However, it would have been obvious to one of ordinary skill in the art at the time of the invention for the transmitter and receivers arrays of Green to share a lens, as described above for claim 5.

7. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Green (US Patent Application Publication No. 2002/0141011) in view of Pavelchek (US Patent Application Publication No. 2002/0071160).

Regarding claim 8, Green discloses the interconnect of claim 7, but does not disclose that the array of detectors comprises an array of positive-intrinsic-negative (PIN) photodiodes. Pavelcheck discloses a free-space transceiver using PIN photodiodes for the receiver

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(paragraph 0054). It would have been obvious to one of ordinary skill in the art at the time of the invention to use PIN photodiodes for the photodiodes of Green, because PIN photodiodes are less complicated to implement than other types of photodiodes, as taught by Pavelchek.

Conclusion

8. Any inquiry concerning this communication from the examiner should be directed to N. Curs whose telephone number is (571) 272-3028. The examiner can normally be reached on M-F (from 9 AM to 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan, can be reached at (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (800) 786-9199.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://paired.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


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